SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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SLATE AND STONE QUARRYING MACHINERY.

The importance to quarry proprietors of efficient machinery applicable to the economic raising of heavy weights is so thoroughly recognised, that it is altogether unnecessary to explain the advantage likely to accrue from the introduction of an improved form of travelling crane; it will suffice to record in what the improvements consist. It is well known that the ordinary "travelling jenny" consists of a crab winch mounted on a carriage travelling on a pair of rails, carried upon a platform or carriage mounted on two or more pairs of grooved wheels, which travel on a pair of parallel rails laid on two parallel lines of sleepers placed some distance apart, and at right angles to the transverse carriage, upon which the crab winch carriage travels. These sleepers are supported on timber or other framings some height from the ground, the crab winch being used to elevate and remove stones and other ponderous bodies within the limits of the framing supporting the rail sleepers, the stones or other heavy bodies being lifted vertically by means of the crab winch directly from below, and moved horizontally by moving the crab winch carriage, or the scaffold by which the weight is supported, and which operations have heretofore generally been performed by hand.

The improvements which Mr. Sampson Moore, of the North Foundry, Liverpool, proposes to introduce consist in mounting a jib crane upon the travelling scaffold, to enable weights to be lifted and carried beyond the limits of the line of rails upon which the platform travels, and in so arranging the various parts of the apparatus that the same may be worked by hand, or by a stationary steam or other motive-power engine, placed on the ground, or in any other convenient situation. The improvements are carried out by mounting at each end of one side of the framing which carries the rails upon which the reciprocating scaffold travels grooved pulleys on fixed bearings carrying an endless rope, one of which grooved pulleys may be driven by a stationary steam or other motive-power engine through a driving band working over a pulley keyed on to the axle of the grooved pulley carrying the endless rope, or its mechanical equivalent. The upper fold of the endless rope is carried under a grooved pulley on the fore part of the side of the travelling scaffold, which grooved pulley is keyed on to a short horizontal transverse shaft, revolving in fixed bearings, and at the back of which grooved pulley, and on the same shaft, is also keyed a friction wheel. The endless rope is then curved, and carried over the top of another grooved pulley, mounted on a shaft parallel to the last described, and which shaft is also fitted with another friction wheel. The axle of this pulley and friction wheel revolves in fixed bearings, in line with and below the axle of the winding barrel of the winch. The rope is thence carried down under a grooved grinding pulley in the rear part of the side of the travelling platform, and thence over the grooved pulley on the reverse end of the stationary frame. Between the first and second described friction wheels on the travelling scaffold is an intermediate friction wheel, mounted on the end of a transverse shaft, revolving in hanging bearings, which have a short oscillating motion, for the purpose of bringing the friction wheel in contact with either the first described friction wheel on the shaft which carries the grooved pulley under which the endless rope passes, or against the friction wheel immediately below, or in vertical line with, the winch barrel on the axle of the grooved pulley over which the rope passes. The transverse shaft, on which this intermediate friction wheel is keyed, extends about two-thirds of the distance across the platform, and the inner end of which is fitted with a bevelled toothed spur wheel, which gears into a transverse bevelled wheel, keyed on to a shaft mounted at a right angle, and extended obliquely downwards from the last-described transverse shaft, and which oblique shaft is fitted with a bevelled toothed spur wheel, which gears into a bevelled toothed wheel mounted on a transverse driving shaft, which extends beyond the first pair of wheels, upon which the scaffold travels, and which shaft carries on each end a spur pinion wheel, which gears into toothed wheels keyed on to the axle of the running wheels. The bevelled toothed wheel on the long transverse shaft is fitted with clutch gear, so that it may be thrown in or out of action. This long transverse shaft is also fitted with a second bevelled toothed wheel and clutch gear, which toothed wheel works into an horizontal bevilled toothed wheel on the lower end of a vertical shaft, the head of which carries a second bevelled toothed wheel, into which works a bevelled tooth pinion, mounted on a horizontal axle, revolving in fixed bearings, and which is fitted at one or both ends with a crank handle, for the purpose of actuating the stage by hand when the clutch gear of this movement is locked, the handle, or handles, being turned in the direction required for moving the stage either backwards or forwards, in which case the other bevelled toothed wheel of the long transverse driving shaft being disconnected by its clutch gear allows the shaft to revolve freely, without imparting or receiving motion from the last-mentioned wheel. The object of mounting this intermediate friction wheel on hanging bearings is to allow it to be oscillated or pressed against one or other of the friction wheels between which it is situated, so as to drive the scaffold backwards or forwards, the intermediate wheel being brought up to the periphery of the friction wheel in front or in rear thereof by means of a hand lever. In rear of the friction wheel on the side of the centre of the carriage is another friction wheel, keyed on the end of a transverse shaft, which is also mounted on hanging oscillating bearings, so that it may be brought into contact with the friction wheel on the shaft of the grooved pulley over which the rope passes, or be thrown backwards against a stationary break. The transverse rocking shaft, upon which this last described friction pulley is keyed, is fitted at its inner end with toothed gear for actuating the winch when in contact with the friction wheel for the purpose of lifting, and when back against the stationary brake fitted on the side of the travelling carriage in rear thereof by means of a hand lever, the operator will have perfect control over the descent of the weight lifted by the jib crane. The spur gear on this shaft is also arranged so that it may be thrown out of gear, to allow the crab winch to be worked by hand through crank handles, in the usual way.

As a modification of this arrangement, Mr. Moore observes that, if preferred, the endless driving band, chain, or rope may be so arranged as to actuate the various parts of the apparatus in either directions by carrying the said rope across the transverse scaffold upon which the jib crane or crab winch carriage travels in fourfold, so as to get the rope to travel twice in the same direction, one fold of which runs on one side and the other on the opposite side of the horizontal friction driving wheels carried on the winch carriage, and mounted on short vertical shafts, having their bearings on horizontal swinging brackets, so that they may be brought up to the endless band on either side, as required, by means of a hand lever worked from the carriage of the crab winch. The short vertical shafts of the horizontal driving pulley are each fitted with a toothed pinnion wheel, which gears into horizontal toothed wheels, keyed on to vertical driving shafts, from which the power is conveyed in any convenient manner to actuate the moving parts of the apparatus in either direction. The endless band is prevented giving way latterly by horizontal antifriction pulleys placed on the outside of the rope, and which are carried on the frame of the winch carriage; or, if preferred, the endless driving rope may be carried across the transverse carriage, upon which the winch carriage travels in two folds only, in place of fourfold, as described, by arranging one fold to run immediately above the other, and passing them through suitable guides, formed on vertical levers mounted on the winch carriage, and having their fulcrums between the upper and lower fold of the rope, by which arrangement the peripheries of the driving wheels may be brought up to the upper or lower fold of the driving band, and as each fold runs in an opposite direction the various moving parts of the apparatus may be actuated in either direction by merely passing the peripheries of the driving pulley against the band or rope: by passing the levers outwards the lower fold of the rope will be be brought into action, and if the levers be drawn inwards the upper fold will be brought into action, whilst by keeping the levers perfectly vertical the driving rope will be out of play.

LIFE AND DEATH IN THE MINES.

I.—ACCIDENTS IN COAL MINES.

Fuller has termed those who are maimed in following their calling "industry's martyrs;" we may with equal propriety call those who perish while pursuing their lawful trade "industry's victims." Few occupations count more martyrs than that of a miner. The record of several years past shows that, on the average, upwards of three persons every working day are killed in the collieries alone of Great Britain. What may be the proportion and degree of injury of less serious character inflicted by accidents in these workings we do not know. It has often been remarked in statistical researches that events, apparently fortuitous when viewed in small and isolated numbers, assume, as it were, a regular law when considered under a wider scope. Paradoxical as it may sound, accidents appear to be very regular occurrences. Look at the figures in our first table. There is a consistency in the amounts not only of the totals, but in the subordinate exponents of each year, that could hardly have been anticipated in a statement of casualties extending over three years only:—

Number of fatal accidents in the mines, in the shafts, and on the surface of the coal mines of Great Britain in three years:—

In the Mine.	1860.	1861.	1862.
Explosion of fire-damp and gunpowder, and suffocation by gases	86	85	74
Fall of material	379	413	402
Irruptions of water, inclines, trains & machinery underground, &c.	99	99	102
Accidents in the shafts	157	149	110
Total accidents in mines	721	746	688
On the surface	48	66	51
Total accidents	769	812	739

Nor is the relation much changed by taking a longer series of observations. Beginning with 1856, and terminating with 1863, we have these numbers—806, 759, 708, 802, 769, 812, 739, and 757 fatal accidents respectively. The accidents are divided in the reports of the Inspectors of Mines under five heads, as designated in the subjoined statement:—

Average number of fatal accidents in coal mines for the years 1860, 1861, 1862, and the proportion per cent. of each description:—	Average number.	Rate per cent.
Explosion of fire-damp, &c.	82	10·6
Fall of materials	398	51·4
Irruption of water, &c.	100	12·9
Accidents in the shaft	139	18·0
Accidents on the surface	55	7·1
Total	774	100·0

We learn from this statement that more than half the accidents arise from the falling in of materials, coal and stone, upon the miners when at work. More than *one-third* of the numbers killed meet their fate from this cause. Yet this seems to be a cause very much, if not entirely, under the control of the miner.

"The observations," says Mr. Dickinson, one of the Mine Inspectors, "which I have previously made as to this class of accidents apply still; the collier seems to expect that the coal which he is undermining will always remain fast, as it usually does, until it be cut at the sides and wedged or blasted down; and that the roof, if of a strong kind, will remain without propping, as he has previously found it to do; and he goes on working, thinking sprags and props an unnecessary precaution, until an unseen crack, a slippery parting, or a subsiding of the strata causes a sudden fall, and he has either a narrow escape or is hurt or killed."

Mr. Dickinson estimates that 200 lives would be annually saved by the proper use of "sprags and props." Another Government Inspector, Mr. Wynne, states in his report for 1861 that "it has always been his opinion that propping and spragging ought not to be left to the will or caprice of the workmen themselves." And he shows, farther, that in collieries where timbering has been enforced scarce a life has been lost from the fall of materials.

The number of deaths from accident discloses a greater variation from year to year than the accidents themselves; but when we divide the list into two periods of four years a remarkable approach to equality is discovered:—

1856	1029	1860	1109
1857	1122	1861	934
1858	930	1862	1133
1859	914	1863	907
Total	3995	Total	4083
Average	999	Average	1021

It should be remembered, too, that the quantity of coal brought to surface in the last four years was much greater than in the first four.

Average number of deaths from each class of accidents in coal mines for the years 1860-1-2, and the proportion per cent. from each description:—

	Average number of deaths.	Ratio per cent. of each class of total.
Explosion of fire-damp, &c.	316	29·8
Fall of materials	412	38·9
Irruption of water, &c.	111	10·5
Accidents in the shaft	161	15·2
Accidents on the surface	59	5·6
Total	1059	100·0

The annual average number of deaths during the three years was 1059, that is to say, at the rates of 3·4 every working day. To the mortality from falling materials, that arising from the "explosion of fire-damp," "explosion of gunpowder," and "suffocation by gases," ranks next, yielding an average of 316 victims, or 30 per cent. of the total deaths. Here, too, is found abundant testimony of the carelessness of the workers, and the frequent neglect of those who are placed over them. Last year Mr. Higson reported that—

At those collieries where safety-lamps only are used, where explosive gas abundantly prevails, not a life has been lost by fire-damp, nor has a single explosion taken place. If anything, therefore, could prove more conclusively than this the advantage to be gained by a general use of covered lights in mines that emit gas, combined with adequate ventilation, it is the result of their application in the county of Durham, wherein not a life was lost in the period of one year by an explosion of gas in that extensive and fiery district.

Mr. Morton, in reporting upon an explosion of fire-damp, which killed six men and boys, in a mine near Sheffield, observes:—"My official enquiry relative to this serious misfortune reveals a lamentable disregard of the recognised preventives against those mining casualties which arise from combustible gas."

Accidents in the shaft are described as "over-winding," "rope and chains breaking," "whilst ascending and descending," "falling into shaft from surface," "things falling from the surface," "falling from part way down," and "miscellaneous." Under the next division of casualties are "irruptions of water," and "falling into water," accidents on "inclines underground," and by "trams and tubs underground," and by "machines underground." Fatalities from inclines and trams being far more numerous in this section than from other causes named.

Another illustration of the regularity of accidents is furnished by the ratio of mortality to the number of casualties in each of the three years.

Number of accidents and number of deaths from accidents in the coal mines of Great Britain in three years:—

	Accidents.	Deaths.	Ratio of deaths to accidents.
1860	769	1109	1·4
1861	812	934	1·2
1862	739	1133	1·5

In 1856 the proportion was 1·3, in 1857 it was 1·5, in 1858 it was 1·2, and in 1859 it was 1·0. Hence, during seven years the deaths have never on the annual average fallen below one, nor risen above one and a-half, to each accident.

It is obvious that, all other things being the same, the larger the quantity of coal worked the greater the liability to accidents. During the three years the mortality from accidents ranged from one death in proportion to every 71,000 tons raised to one death in every 89,000 tons.

Number of deaths from accidents in the coal mines of Great Britain in three years:—

	Deaths.	Tons of coal raised.	One death to quantity raised.
1860	1109	79,923,000	71,000
1861	934	83,152,000	89,000
1862	1133	81,511,000	72,000

When the English death-rate from coal pit accidents is compared with the Scotch rate a marked difference in favour of the latter country is disclosed. The annual average mortality in England and Wales in 1860-1-2 was 39 in every 10,000 coal miners; while the rate in Scotland was only 25, the rate for Great Britain being 37. Scotland employs one-seventh of the number of coal miners that find work in England and Wales.

Number of coal miners in Great Britain (census 1861). Average number of deaths from accidents, 1860-1-2:—

	Coal miners.	Deaths from accidents.	Deaths per 1000 miners.
England and Wales	246,613	969	3·9
Scotland	35,886	90	2·5
Great Britain	282,499	1059	3·7

A similar disparity is found when the deaths are computed with reference to the weight of coals brought to the surface. The quantity in the three years was in England and Wales 211,889,000, and in Scotland 33,058,000 tons. The English rate was one death to 73,000 tons; the Scotch one death to 123,000 tons. The same difference emerges if the comparison be carried back for three or four years. There is one source of death which appears to be less active in the Scotch than in the English works—irruptions of water. In the eight years ended with 1863 there were in all 7450 fatal accidents in England and Wales; of this number 481, or 11 per cent., were due to this cause; but in Scotland, out of an aggregate mortality of 674, there were only 35, or 5 per cent., of the deaths which were consequent upon irruptions. But still wider diversities are discoverable among the English coal districts. To show the differences in the coal miners' exposure to risk, according to the area in which he works, we have prepared the two following tables from the data of the years 1860, 1861, and 1862. The first table sets out the absolute number of deaths:—

Number of deaths from accidents in coal mines, in each district of Great Britain, in three years:—

	1860.	1861.	1862.	Total.
Northumberland, Durham, and Cumberland	153	99	325	577
South Durham	89	76	56	221
Yorkshire	50	69	108	227
Derby, Notts, Leicester, and Warwick	50	69	43	162
North and East Lancashire	58	82	59	199
West Lancashire and North Wales	89	104	82	275
North Staffordshire, Salop, and Cheshire	67	42	64	173
South Stafford and Worcester	144	134	114	392
South-west of England	198	69	60	327
South Wales	118	101	135	354
Scotland—Eastern District	36	52	49	137
" Western District	57	37	38	132

The second gives the rate of mortality in each district, according to the quantity of coals raised. But the twelve districts of the former table have here from necessity been reduced to eight, for the purpose of obtaining the coal worked in each, in areas corresponding with those in reference to which the mortality is taken. The data obtained from two different returns could not otherwise be made available.

Number of deaths from accidents in coal mines in the three years ended with 1862:—

	Deaths.	Tons of coal raised.	One death to quantity raised.
Northumberland and Durham	798	60,506,000	76,000
Yorkshire	227	27,914,000	123,000
Derby, Notts, Leicester, and Warwick	162	19,360,000	120,000
Lancashire and North Wales	474	39,424,000	83,000
Stafford, Salop, Chester, and Worcester	565	27,105,000	48,000
South-west of England	327	20,224,000	62,000
South Wales	354	17,514,000	52,000
Scotland	269	33,057,000	123,000
Total	3176	245,104,000	77,00[illegible]

Now, the risks, according to this table, vary greatly; in the Staffordshire district, for example, they are nearly three times as great as in Yorkshire or Scotland. Looking to a certain regularity in the causes of death, observations extending over three years may be accepted as establishing the relative exposure of the districts to fatal accidents. But the position of the districts is best seen in the following list, where the most dangerous take precedence:—

	Tons of coals raised.
1.—Stafford, Salop, Chester, &c.	1 death to 48,000
2.—South Wales	1 death to 52,000
3.—South-west of England	1 death to 62,000
4.—Northumberland and Durham	1 death to 76,000
5.—Lancashire and North Wales	1 death to 83,000
6.—Derby, Notts, Leicester, &c.	1 death to 120,000
7.—Yorkshire	1 death to 123,000
8.—Scotland	1 death to 123,000

The immense coal fields of Northumberland, Durham, and Lancashire occupy in this scale of risk an intermediate degree.

Accidental explosions of fire-damp are highly destructive to life in the coal mines. In the six years ended with 1862 we count 400 of these fearful casualties, which resulted in 1289 deaths, or rather more, on the average, than three to each casualty—that is, double the mortality of coal pit accidents generally.

Number of explosions from fire-damp, and deaths therefrom, in Great Britain, in the six years ended with 1860:—

	Explosions.	Deaths.
1857	70	317
1858	70	215
1859	71	95
1860	70	363
1861	61	109
1862	55	190
Total	400	1289

Here the fatality of one year with another, as determined by explosions of fire-damp, vary greatly; the accidents of 1860, for example, being four times as destructive of life as those of the previous year.

One is struck, in looking through the Inspectors' reports, with the many instances of recklessness on the part of the men and of criminal neglect upon the part of the masters or their agents. A few cases have been already cited. We will, however, conclude with a few examples from the most recent of this series of blue-books. Mr. Dunn reports of the Coxlodge explosion, which happened in the spring of 1863 and killed 26 persons, that "this dreadful affair took place from want of caution on the part of some one connected with the management, who permitted naked lights and the gas lamps to be worked simultaneously whilst they were taking off the pillars." Two months later the same Inspector places on his list of fatal casualties "Cleator Moor Colliery explosion, whereby four lives were sacrificed through the utter neglect of my caution and remonstrances, both after the previous explosion in the Hope, in July, 1862, and at the hearing of the summons in 1863." This accident, which arose from what Mr. Dunn terms an "unwarrantable system of ventilation," led to much angry recrimination. Mr. Higson remarks that "some of the accidents which have happened during the year belong to that class which, in mining operations, rarely occur; others have happened through the careless and disobedient conduct of the workpeople, who have in some instances acted in open defiance of the regulations lawfully established for their guidance; several from defective provisions and inefficient management of the works." "The case of suffocation at Cwm Neol," observes Mr. Evans, "is evidence of foolhardiness on the part of the men themselves, for the deceased was expressly forbidden by the overman of the colliery to enter the level, as he had just returned therefrom, and found gas in considerable quantities therein." The explosion at the Edmond's Main Colliery, which killed 59 men and boys, was caused, according to the verdict of the coroner's jury, by "the dangerous use of gunpowder in blasting in the *dip-bord gates* of this mine; which practice of blasting ought not to have been permitted by the managers or prosecuted by the workmen after the system of wedging was introduced." This avoidable accident cost the proprietors 1550*l.* in compensation to the distressed widows and children, besides some "thousands in their unremitting efforts to re-open the closed pits," &c.

—*Manchester Guardian.*

ENGLAND'S EARLY ENGINEERS.

There is, probably, no class of literature more generally attractive than the biographies of working men whose labours, in connection with works of public importance, have made them eminent, more especially when the style of writing is of that thoroughly popular character adopted by Mr. Samuel Smiles. To meet the requirements of that numerous class of readers beyond whose reach that admirable work, the "Lives of the Engineers," was placed by the high price at which it was published, a cheaper and slightly abridged edition* has now been issued by Mr. Murray, and will not fail to meet with considerable patronage. In narrating the Life of James Brindley and the Early Engineers, Mr. Smiles supplies a very interesting introduction, pointing out that labour and skill have made modern England, and giving the history of the early settlement of Britain, the early works of embankment and draining until the time of James I., by whom drainage works were encouraged to a considerable extent. In 1607, shortly after the accession of James I., a series of destructive floods burst in the embankments along the east coast, and swept over farms, homesteads, and villages, drowning large numbers of people and cattle. When the King was informed of the great calamity which had befallen the inhabitants of the Fens, principally through the decay of the old works of drainage and embankment, he is said to have made the right royal declaration, that "for the honour of his kingdom he would not any longer suffer these countries to be abandoned to the will of the waters, nor to let them lie waste and unprofitable, and that if no one else would undertake their drainage he himself would become their undertaker." A commission was appointed to enquire into the extent of the evil, from which it appeared that there not less than 317,242 acres of land lying outside the then dykes which required drainage and protection. Two years later a bill for draining 6000 acres in Waldersea county was passed—the first district Act for fen drainage that received the sanction of Parliament. Companies were readily formed for undertaking the work, on condition of receiving two-thirds of the reclaimed land, but owing to want of practical knowledge the results were not very satisfactory. There were then loud calls for some skilled undertaker, but no Englishman was to be found ready to enter upon so large an undertaking, and in this dilemma the King called to his aid one Cornelius Vermuyden, a Dutch engineer, a man well skilled in works of embanking and draining. As an instance of the backward state of England in the sixteenth and seventeenth century in connection with engineering science, it is mentioned that when the *Mary Rose* sank at Spithead, in 1545, Peter de Andreas, the Venetian, with his ship's carpenter and three Italian sailors, were employed to raise her, sixty English mariners being appointed to attend upon them merely as labourers.

Cornelius Vermuyden, the Dutch engineer, was invited over to England in 1621, to stem a breach in the Thames embankment near Dagenham, which had been burst through by the tide; he had been trained as an engineer, and having been brought up in a district where embanking was studied as a profession, and gave employment to a large number of persons, he was familiar with the most approved methods of protecting land against the encroachments of the sea. He was so successful in his operations at Dagenham, that when it was found necessary to drain the Royal Park at Windsor he was employed to conduct the work, and he thus became known to the King, who shortly after employed him in the drainage of Hatfield level, then a royal chase, on the borders of Yorkshire. But it appears that although Vermuyden was for a time successful, and even received the honour of knighthood in recognition of his labours, his successes were temporary only: after labouring for a quarter of a century, and by his engineering skill conferring lasting benefit upon the inhabitants of many marshy places in this country, he was so strenuously opposed that in 1656 he had to appear before Parliament as a supliant for redress, and thenceforward he entirely disappears from public sight; and it is supposed that very shortly after he went abroad, and died a poor broken down old man, the extensive lands which he had reclaimed and owned having been conveyed to strangers.

We next come to the history of the life of Sir Hugh Myddelton, whose connection with the New River renders his name familiar to everyone. Hugh Myddelton, the London goldsmith, was born in 1555, at Galch Hill, near Denbigh. Richard Myddleton, the father of the subject of the memoir and fifteen other children, was governor of Denbigh Castle in the reign of Edward VI., Mary, and Elizabeth, and several of his sons rose to distinction. The third son, William, was one of Queen Elizabeth's famous sea captains; the fourth, Thomas, was an eminent grocer and citizen of London, knighted whilst sheriff in 1603. He was the founder of the Chirk Castle family. The fifth, Charles, succeeded his father as Governor of Denbigh Castle; the sixth was Hugh; the seventh was a citizen of London, and afterwards member of Parliament; and Foulk, the eighth, was high sheriff of Denbigh. Hugh Myddelton was entered an apprentice of the guild of the Goldsmiths' Company. The goldsmiths of that time were not merely dealers in plate, but in money also, and usually united the trade of goldsmith with that of banker, money-changer, and money-lender. Myddelton's goldsmiths shop was situated in Bassishaw, now Basinghall-street, London, then consisting almost exclusively of what is now called the City, and there were few or no buildings east of Aldgate, north of Cripplegate, or west of Smithfield. Hugh Myddelton did not confine himself to the trade of a goldsmith, but upon the withdrawal of the privileges of the foreign merchants in England he embarked in cloth manufacture, and took part in the maritime adventures of the period. The subject of water supply to the northern parts of the City was still under the consideration of Parliamentary committees; but the chief difficulty was not in passing an Act, but in finding a man to execute the work. In 1608 Capt. Colthurst's proposal to bring a running stream from Hertfordshire was negatived by the Common Council, but in the year following Myddelton's proposal to bring a supply of water from Amwell and Chadwell to Islington was accepted, subject to his beginning the work within two months. Under this arrangement the work was commenced, and, with the assistance of the king, James I., the opposition of the landowners was overcome, the work was completed, and the New River water was admitted into London, at a public ceremony, on Michaelmas-day, 1613. So doubtful was the success of the undertaking, that in 1636 Charles I. re-granted his half-interest (36 shares) in the concern to the company, in consideration of a fee-farm rent of 500*l.*, which to this day is paid by them yearly into the Exchequer. At the present time each share produces about 850*l.* per annum. In 1617, the Company of Mines Royal farmed their Cardiganshire Mines to Sir Hugh at a rental of 400*l.* per annum, and his mining adventure seems to have been attended with success, for we shortly after find him sending considerable quantities of silver to the Royal Mint to be coined. To the close of his life we find him engaged in correspondence on various subjects—mining, draining, and general affairs, his death occurring on Dec. 10, 1631, at the advanced age of 76. The succeeding chapter is devoted to the biography of Capt. Perry, whose principal merit consists in largely contributing to create the navy of Russia, and lay the foundation of its afterwards splendid system of inland navigation: for these exertions he failed to receive his promised remuneration.

The next memoir which Mr. Smiles gives us is one of, perhaps, greater interest than either of those already alluded to—it is the story of the life of James Brindley. Down to the middle of last century the trade and commerce of England were comparatively insignificant. This is sufficiently clear, from the wretched state of our road and river communication about that time; for it is well understood that without the ready means of transporting commodities from place to place, either by land or water, commerce is impossible. In the reign of James I. several Acts of Parliament were passed, giving powers to improve rivers, so as to facilitate the passage of boats and barges carrying merchandise, and the general importance of the subject seems to have become fully recognised. By these circumstances an opportunity was afforded to Brindley to display his natural talent to considerable public advantage. His early knowledge was acquired as apprentice to a millwright; and although at first his efforts did not appear to be very successful, before three years of his time had expired he displayed great natural skill. Whilst working as an apprentice at Macclesfield he had taught himself the art of writing, but he never mastered it thoroughly, and to the end of his life he wrote with difficulty, and almost illegibly. Amongst his earlier works were numerous flint-mills for pottery purposes, and the success which attended his efforts in this direction brought him not only fame but business also. We next find him engaged in draining the coal mines on the Clifton Estate, near Manchester; his system of operation was to bring the waters of the Irwell through a tunnel, to work a breast-wheel, and then permit it to escape to the same level at a lower level, the power thus obtained being used to set the pumping-machinery in motion. But Brindley's great success was, doubtless, in connection with the Bridgwater Canal, where his skill and ingenuity secured him a reputation which will long continue. Long before the duke's canal was finished, Brindley was actively employed in carrying out a still larger enterprise—a canal to connect the Mersey with the Trent, and both with the Severn, thus uniting, by a grand line of water communication, the ports of Liverpool, Hull, and Bristol. Incidentally, we have an account of the life of Josiah Wedgwood, and the volume closes with an interesting sketch of the influence which Brindley's canals exercised upon the enterprise and speculation of the time.

By way of appendix, Mr. Smiles supplies an account of the Grand Canal of Languedoc, and its constructor, Pierre-Paul Riquet de Bonrepos, and by this means renders the work as complete a history of canal making as the "Lives of George and Robert Stephenson," (which forms a companion volume, to which we shall take another opportunity of referring), forms of the history of railways. The amount of information contained in the volume before us could only have been collected with enormous labour, and the admirable manner in which it is put together reflects the greatest credit upon the author. The curtailment, as compared with the more expensive work, the first volume of the "Lives of the Engineers," is quite unimportant, whilst the price at which the present book is offered cannot fail to secure it large and lasting patronage from all classes.

* "James Brindley and the Early Engineers." By SAMUEL SMILES. London: John Murray, Albemarle-street.

METEOROLOGY OF CLIFTON.—A series of very useful tables, giving the results of ten years' observations of the barometer, thermometer, rain, &c., recorded at the South Parade, Clifton, by Mr. W. C. Burder, F.R.A.S., and Member of the Council of the British Meteorological Society, has just been issued by Messrs. Groombridge and Sons, of Paternoster-row. Every care has been taken to secure accuracy in the results, and, as Mr. Burder very truly says, in the present state of meteorological science this is all that should be done; but he considers there is every reason to hope that the next twenty years (say) will see a mass of trustworthy observations made in a great number of different parts of the country, capable when discussed of yielding most important results. The first table shows the mean temperature of the air at 4 ft. above the ground during each month of the ten years ending December, 1862, whilst the succeeding tables gives the departure from the mean temperature of each month, the mean temperature of the years, the mean temperature of the months for the ten years, the maximum and minimum temperature for each month, the mean daily maximum and minimum temperature for each month, and the mean daily range of temperature for each month—all for the ten years. The result shown is that there is no month in the mean of the series of ten years which has a mean minimum as low as the freezing point of water. The ninth table shows the mean temperature of evaporation which is followed, and the tenth the difference between the mean temperature. The pressure of the atmosphere, the highest and lowest readings of the barometer during each month, the fall of rain, the humidity of the air, an ozone table, and a series of tables of the mean direction of the wind are given, the work being thus rendered a most complete record of all that is required to be known upon the subject, and forming an excellent model for other observers to imitate.

LITERARY AND SCIENTIFIC REGISTER.—The twenty-fourth edition of the very useful pocket book known as "Gutch's Literary and Scientific Register and Almanac" has just been issued. The information contained appears to have been well revised up to the last moment, the results of the most recent discoveries and researches being duly given in their proper places. Besides the ordinary almanac matter, the pocket book before us contains an admirable epitome of the facts connected with the principal arts and sciences associated with general life—acoustics, aerial phenomena, agriculture, anatomy, angling, architecture, astronomy, botany, building, chemistry, domestic economy, ecclesiastical chronology, gardening, geography, geology, history, hydraulics, mathematics, painting, photography, physiology, therapeutics, &c., being among the number. There is, probably, no other work which contains so large an amount of information in so small a space—the work being, in fact, little less than a vest-pocket encyclopædia.

GEOLOGICAL MAGAZINE.—The December number of this magazine contains two original articles—the one "On the Brachiopoda of the Lower Greensand of Surrey," &c., by Mr. Meyer, which is illustrated by two well-executed plates; the other "On the Rhætic beds of Somerset," by Mr. W. B. Dawkins. The abstracts of Foreign Memoirs, Reviews, Reports and Proceedings of Societies, Correspondence, and Miscellaneous matter, are of the usual interesting character. The title and index to the first volume accompanies the number.

SURVEYORS' HANDBOOK.—Mr. John Thomas Hurst, C.E., has just issued (through Messrs. Spon, Bucklersbury) an extremely useful handbook of formulæ, tables, and memoranda for architectural surveyors and others engaged in building. Although the book before us necessarily contains many particulars to be found in the various Engineer's Pocket-books published in similar form, Mr. Hurst's little book is by no means a plagiarism upon anything that has preceded it. Many of the formulæ and tables are published for the first time, and the articles more especially belonging to the surveyor's profession have been expressly written for the work. As in valuations, &c., the business of the surveyor is frequently closely connected with life assurance calculations, Mr. Hurst appends a series of present value of annuities for fixed terms and on lives, single and joint, which (judging from a comparison made of a few of the figures taken promiscuously with standard works in which they are given) appear thoroughly reliable. For those connected with the profession for which the book is intended, the volume, although no larger than an ordinary pocket-book (5 in. × 3 in. × ¾ in.), will form an admirable substitute for a very respectable library.

TIN MINES IN SPAIN.—At the Royal Institution of Cornwall, Mr. R. Pearce referred to an interesting specimen of crystals of tin, from Cospino, in Spain, which had been sent by Captain Bray from the mines which he was engaged in working at that place; and he trusted that at the spring meeting of the society Captain Bray would furnish them with a paper, and some specimens from the mines at Biaritz. The Cospino mines were in Gallicia, about 60 miles distant from the mines Mr. Hustler was engaged in working. Dr. Barham said that great interest attached to the tin mines in Spain, owing to the fact of the Spanish Government having for a long time ignored the existence of tin in that country. Mr. Hustler, as they were aware, was now engaged in conducting tin mines in Gallicia which had yielded large quantities of tin, which had been sold in this country; and he was glad to learn from Mr. Pearce that they were likely to have some account of the old and long-abandoned tin workings in Spain.

NEW GUNPOWDER.—At the Royal Institution of Cornwall, Mr. R. W. Fox referred to a new gunpowder, invented by a German medical gentleman named Echrhardt, who thought that it would supersede the ordinary gunpowder for blasting purposes in their mines. He had recently, among others, witnessed its effects, and they were certainly most astonishing. Dr. Echrhardt produced two powders, which when kept separate were perfectly harmless, and might be even exposed to the fire without injury, but when they were mixed together their explosive power was truly extraordinary—greater even than that of gun-cotton. In one experiment a piece about an inch in length was placed in a hole in a granite rock, and on being exploded it completely shivered it. In another case a certain quantity of gunpowder sent a ball 75 yards, while an equal quantity of the new powder projected the ball 240 yards. A Prussian officer was present during the experiments, and he and everyone else were astonished at the manner in which it blew everything to pieces. Water did not affect the powder in the least, and in fact, in one instance the inventor applied water to explode it. Mr. R. Pearse said he happened to meet with the principal agent of Devon Great Consols Mines, and he informed him that the powder had been tried there in different levels, with most successful results. Everyone who witnessed the experiments was astonished at the effects it produced.

COPPER MINING—DEVON GREAT CONSOLS—No. III.

A mine is worked by the men employed either upon "tutwork" or "tribute." Tutwork is simply excavation at a stated price per fathom according to the nature of the ground, and it is usually "set" for two months: that is to say, a party or pare of men engage to excavate in a certain part of a mine at such a price per fathom as they may agree upon with the management. In some cases they may do as much as they can at the price n the two months; at others they have a certain number of fathoms given them to do. At Devon Consols settings are made on each monthly pay-day, so that half the mine is dealt with at a time. Tribute is of an entirely different character from tutwork. The tributer engages to raise ore from a spot set at a tribute of a certain number of shillings in 1*l.*, the amount varying with the richness of the mineral and the hardness of the rock The more money the ore which tributers raise produces the more money they get. Tutwork and tribute are thus both piece work, and both speculative. Men may be able from favourable circumstances to raise more ore or drive more fathoms than was calculated when the setting was made; but, on the other hand, the rock may prove harder than was anticipated, or the lode poorer. No engagement, however, lasts more than two months, and by the end of that time arrangements fair to both parties will be made. Tutwork prices will vary from 18*l.* to 2*l.* per fathom; and it may be added that in the last report a portion of one of the lodes was stated to be worth 200*l.* per fathom. There is very little tribute work done at Devon Consols.

The miners at Devon Great Consols descend and ascend the shafts by ladders, which is a severe tax upon their energies, as the writer of these articles—having in the course of his visits to the mine gone down to the 115 fathom level (690 feet)—can testify. It takes the men about one hour to ascend from the bottom—224 fathoms. Few, however, work at that depth. The labour is hard enough without the climbing; and we are glad to be able to state that a man-engine will shortly be erected at a centrally situated shaft, which will relieve the men of this intense and unproductive fatigue. There have been difficulties in the way of taking this step; but these have now happily been removed.

As regards ventilation, one of the most important points bearing upon the health of the miner, Devon Great Consols must be favourably spoken of. The excellent draught through the levels and winzes renders the air remarkably pure. In the course of two hours underground the writer, even in the ends, never felt the atmosphere—the smoke of the powder excepted—so oppressive as at many an ordinary public meeting, and the smoke cleared away rapidly. In some of the ends air is introduced by wooden trunks; and the motion of the trucks is said to assist the ventilation by agitating the atmosphere as they pass to and fro. Lower down than the 115 fathom level the ventilation is, of course, not so good, but it is stated to be even there far superior to that of most mines.

It has been before stated that the miners work in pares or parties. Ordinarily each party is portioned into three sections, one of which is always at work, each 24 hours being divided into three "cores." Under this system one section would go on at six in the morning, and work until two in the afternoon, the second would go on at two, and work until ten; and the third would complete the day by working from ten to six. Thus each man would be underground eight hours a day. At Devon Consols there are, however, few night cores; and it is said that the company and the miners alike reap the benefit of this change of system.

The Royal Commissioners, who visited Devon Great Consols amongst the mines which they inspected, reported that there is a want of accommodation for the miners at mines generally, and recommended that suitable places should be provided in which the men might change their clothes before and after work, and that means should be given them of drying their labouring apparel. It is complained that the Commissioners have been too sweeping in their condemnations; and that in censuring those mines where the men are not cared for, they have neglected to give credit to those in which they are. Devon Great Consols should certainly have been excepted; for at the mines belonging to the company "drys" are fitted up for the men, in which they can shift confortably; provision being made for the drying of the wet clothes over flues or steam-pipes. Each man has also a lock-up cupboard; and hot water is supplied to those who want it. The "dry" at Wheal Emma gives the best accommodation, and we believe that improvements are contemplated which will bring the others up to that mark. It is only fair to the company that these facts should be stated, in order that it may not be mistakenly supposed that the health and comfort of the men are so little cared for as rom the general observations of the Mines Commissioners' report might be imagined. Throughout the establishment there are places in which the men, girls, and boys may take their meals in warmth and comfort, hot water for tea or coffee being available, and ovens being provided in which the food they bring with them may be warmed. There are persons in charge of these places who give the requisite attendance. At the main dressing-floor the accommodation for the boys and girls is comprised in a spacious room, well warmed by a central flue, along which are placed seats on which they may sit and warm their feet. They are allowed to come to this place and warm themselves during working hours; and at meals times the boys and girls are kept separate, and good order preserved.

As a matter of great importance in its bearing upon the safety of the miners, it should also be noticed that throughout Devon Consols copper tamping bars are used, with the best results in preventing the deplorable accidents from explosion so frequent where the iron bars are employed. Great care is also exercised in giving out the powder, which is only served to the men in small quantities.

Having described the manner in which the ore is raised and brought to the surface, the next operation that demands our attention is its preparation for market—technically termed the dressing of the ore. This is carried on in places called dressing-floors. The dressing of ore consists in its separation, as far as may be, from the substances of an unmetalliferous character with which it is commonly mixed; in assorting it into different qualities according to its richness and consequent value; and in bringing it, by stamping or crushing, to a semi-sandy condition. Due care is naturally taken in the conduct of this process that whilst that which is worthless shall be got rid of, any ore that will pay for conveyance to the smelting furnaces, and for reduction into metal there, shall be preserved for that purpose. Many of the contrivances by which these objects are accomplished are exceedingly ingenious, and the process of dressing is altogether of a very interesting character, and one that would repay investigation by the stranger to mines and mining work.

There are several dressing floors at Devon Great Consols; but the main floor is situated at Wheal Anna Maria, and from it our description of the process will be derived.

The ore on being hauled up from below is taken to the floors; and the large masses broken up by men with sledges into smaller pieces—a process called "spalling." After undergoing this operation it is taken to the "cobbers"—young women—who with hammers break into yet smaller portions, in the manner calculated to enable them to sort it into qualities, and to separate and throw away the refuse. The necessity for some such operation will be apparent when it is considered that the ore is found in the lode in connection with a variety of quartzose and similarly worthless matter, from which it can only be separated by a process of disintegration. Cobbing answers this end well enough for the separation of the better ore when it is in sufficiently large pieces. The ore stuff which is too small for the cobbers, or at least is small enough not to need being broken smaller, is treated in a different manner. It it first "sized," by being passed in succession through a couple of riddles or sieves, the first having inch apertures and the second half-inch or five-eighths. The ore that remains in the riddles is taken to the "tables"—a kind of high benches on which kneel the "picking girls," children whose duty it is to pick over and sort what is brought to them, casting aside the refuse. The finer stuff—that which passes through both riddles—is "jigged," either by boys by hand, or in what is called the jigging machines—the principle being the same in both cases. A jigging machine may be roughly described as a box into which the small—in fact sandy—ore stuff is put, and "jigged" or shaken. Then, by the operation of specific gravity, the particles of ore, being heavier than the refuse material with which they are mixed, fall to the bottom; so that when the jigging has been continued long enough, a tolerably accurate division of the contents of the machine is made, and the refuse is then skimmed off. To make the separation more complete the stuff thus concentrated is jigged over again, each repetition resulting in greater purity.—*Western Morning News.*

IMPROVED SAFETY-LAMP.—Mr. F. Foster, of Salisbury-street, New North-road, has patented an improvement of Messrs. Howden and Thresh's lamp, which consists in so arranging a catch that the lamp cannot be opened without drawing the wick into the wick-tube. The improvement consists in preventing the wick being raised beyond a given distance, so that it cannot be forced up, and the lamp then opened without extinguishing.

HOT-BLAST OVEN.—Mr. H. E. Clifton, of St. Louis, Missouri, U.S., has invented an improved arrangement for hot-blast ovens, by means of which great economy is effected, and a very regular blast is obtained. He employs a series of double pipes one within the other, the consequence being that the cold air passes over twice the heating surface usual. Mr. Clifton prefers to use fire-clay tubes instead of metal, the former being much less liable to injury from the expansion and contraction from change of temperature. Each pair of pipes is capable of being brought into use or thrown out by simply turning a tap.

PATENT PUMPS.—A pump almost identical with that which has been exhibited for many years at the Royal Polytechnic has just been patented by Mr. F. Walton, of Staines. The alteration which Mr. Walton has made consists in providing two bands instead of one; a kind of flange to the belt being provided, which forms a closed space, which with cross-pieces forms a series of buckets; no external case seems to be used. The invention appears much like an arrangement for raising water in a sieve, and would necessitate the employment of an enormous quantity of power to do an insignificant amount of work.

STEEL WIRE-ROPE.—Some important experiments have been made with galvanised steel wire-ropes at the Dock Testing Works, Birkenhead. The testing was at the instance of Messrs. Jones, Quiggin, and Co., the eminent iron shipbuilders, who are building a monster composite ship, the largest ever built in the Mersey. Being natually anxious to have everything of the best and strongest for this vessel, they determined that the strength of all her materials should be throughly tested. For this purpose surplus pieces were cut from the wire rigging now in course of being manufactured for the vessel at Messrs. Garnock, Bibby, and Co.'s ropeworks. The testing showed the following extraordinary results:—4½ in. steel wire-rope, 57 tons 1 cwt., the Admiralty test for charcoal wire of this size being 24 tons 8 cwts.; 3¼ in. steel wire rope, 24 tons 6 cwts., Admiralty test for charcoal wire of this size 13 tons 10 cwts.; 2¾ in. steel wire-rope, 19 tons 6 cwts., Admiralty test for charcoal wire of this size 8 tons 11 cwts. The experiments were under the inspection of Mr. M'Donald, superintendent of the Birkenhead Testing Works.—*Mechanics' Mag.*

PREPARATION AND PURIFICATION OF MAGNESIUM.—Mixed solutions of chloride of potassium and chloride of magnesium are evaporsted to dryness, and thus a non-aqueous double salt is obtained, which, when reduced with soda in an iron crucible, yields large quantities of magnesium. It may be purified (though for photographic purposes this would be superfluous, and enhance the cost of production considerably), by distillation in an iron apparatus filled with hydrogen.—*Scientific American.*

ORE CRUSHING AND WASHING MACHINERY.

Reference was made in last week's Journal to an improved rotatory shaking table, invented by Mr. Hoffman, of Wilmington-square, and we are now enabled to describe the improved crushing machine and the endless band shaking table, to which we also alluded. In the annexed diagrams, Figs. 1 and 2 represent the section and plan of the crushing machine, and Figs. 3 and 4 the plan and section of the shaking table. Our objection to the India-rubber band, upon which the washing takes place has been already stated, but inasmuch as the separation of the mineral is very perfectly effected there may be instances in which this objection will be of comparatively little moment—such, for example, as in the treatment of rich argentiferous or auriferous ores where the recovery of the last particles of the valuable metal will more than compensate for any trifling additional expense which the use of the band may involve. It will, perhaps, be preferable to describe first the crushing machine, and then the endless table.

FIG. 1

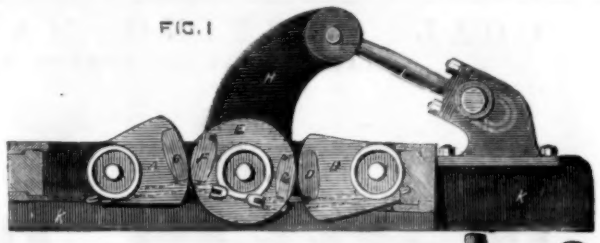


FIG. 2

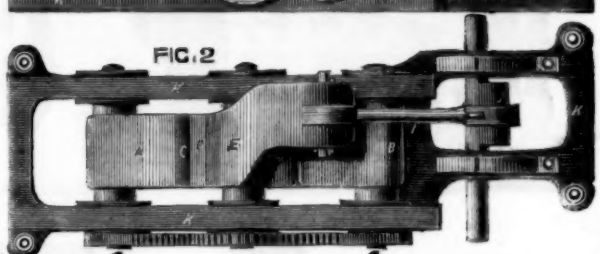


FIG. 3

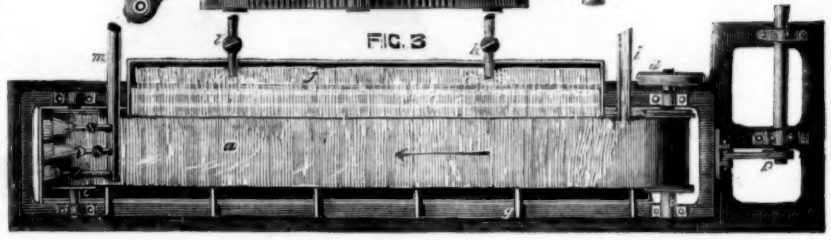
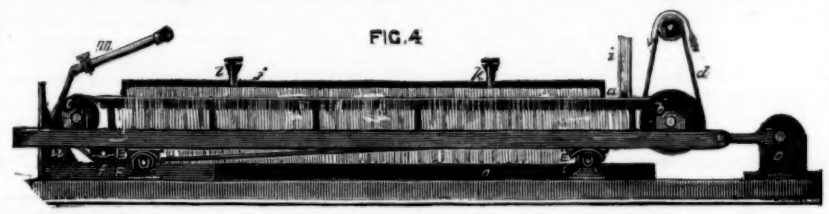


FIG. 4



The crushing machine consists of two segmental-shaped beams, the faces of which are provided with steel or other hard metal crushing blocks; between these beams he places a roller furnished with similar blocks, in such a position that they shall at all times be opposite the corresponding blocks in the segmental beams. The roller is connected by jointed rods to a crank, which communicates a rocking motion to it. The crushing blocks are so arranged that when worn they can be readily removed, and others substituted for them. Fig. 1 of the accompanying engravings is a sectional elevation of a crushing machine constructed according to this invention; and Fig. 2 a plan of the same. Between the two segmental-shaped beams, B B, the patentee places a roller, A. The roller is supported in bearings on the side frames, C C; on one arm of the axis of the roller there is a toothed wheel, D, in gear with similar wheels, E F, on the axles of the segmental-shaped beams. The roller, A, is continued upward in the form of a curved lever, G, to the top of which a connecting rod, H, is united. This rod is caused to travel to and fro by the rotation of the crank, I, on the shaft, K. L L, are steel or other hard metal crushing blocks let into the two faces of the roller, and M M are similar blocks let into the faces of the beams, B B. These blocks are held in their places by keys, *a a*, by withdrawing which the blocks may be removed when necessary. The action of the machine is obvious—the material to be crushed is fed from a hopper or shoot, not shown, between the beams, B B, and the roller, A, where, by their constant oscillation, the material is gradually crushed, and, if need be, reduced to powder. The beams can be set at any distance apart to suit different kinds of material. The advantage of the new crusher, as compared with stamps or crushers in ordinary use, is that each piece of mineral to be crushed accommodates itself in the machine to that position in which the force to reduce it will be properly applied—a small piece will at once fall low in the jaws, whilst a larger piece will be received where the jaws are more widely separated, and gradually descend as its size becomes reduced by the action of the machine.

From what has already been stated with reference to Mr. Hoffman's washing machinery the invention now under consideration will be easily understood; it consists in hanging and arranging tables or troughs (similar to those now in use or otherwise) over or through which a current of liquid is caused to flow, to carry away the earthy and other light matters, in manner hereafter described. The patentee is aware such tables have been made to jog or vibrate, but always in a more or less incomplete, and never in a sufficiently satisfactory manner. Now, this invention consists in suspending or supporting tables, troughs, or receivers, upon a frame or frames supported at two or more points upon eccentrics, or bearings and supports eccentric to each other, so that rapid, tremulous, jogging, and vibrating motions may be communicated to them through eccentric or cam motions, or otherwise.

Fig. 3 represents a plan of the machine, the table of which is composed of an endless band stretched over two rollers; and Fig. 4 a front view. *a*, is the endless band stretched over two rollers, *b c*. The roller, *b*, is driven by a strap, *d*, passed round a shaft or pulley, *e*, but it may be otherwise driven. The tension of the band is regulated by a roller, *f*, under which the band passes. *g*, is a light framing carrying a flat table, on which the band travels. This framing and the rollers, *b c*, are carried by a frame, *h*, to the bottom of which the curved plates, E, are fixed. Rollers, F, eccentric to the curved plates are supported on bearings on the bed of the machine. The frame, *h*, is connected through a rod to the eccentric, D, which on being rotated communicates jogging motion to the machine. The substance to be operated upon is fed on to the band by the spout or shoot, *i*, and as the band travels the substance is brought under a film of water flowing from the trough, *j*, the supply thereto being kept up by the pipes, *k l*. When the washed material arrives near the roller, *c*, powerful jets of water from the pipes and spreaders, *m m*, force the substance off the band into a receptacle, *n*, placed to receive it. The back of the band is slightly raised to facilitate the earthy and foreign matters flowing off from the front, where it falls into a box, *o*, beneath. The material is caused by the tremulous motion and the flow of water from the trough, *j*, to arrange itself in layers—that is to say, the heavier particles remain near the back of the band, the lighter particles being carried towards the front in the order of their specific gravity, and as they arrive at the roller, *c*, they are washed off into separate compartments in the receiver, *n*, the separation being, as before stated, as perfect as could be desired.

Mr. Hoffman has already received orders to place his machine upon a mine, and we hope shortly to be able to report the results obtained.

UTILISATION OF SMALL COAL.—Some few months since reference was made to an invention of Mr. Arthur Wall, from which he anticipated an extraordinary economy in the use of fuel both in connection with the manufacture of iron and in the generation of steam; and although the importance of the invention seems to have been somewhat exaggerated, it appears from the specification of the patent, which has now been published, that the suggestion might be turned to account in the rendering marketable of the enormous quantities of small coal now wasted at the pit's mouth. Mr. Wall's invention consists in combining (for use as fuel for steam-ships, locomotives, stationary engines, and domestic purposes, or otherwise) of the various bodies herein specified, by intimately mixing them together with other materials herein mentioned, and compressing the compound substance so obtained into masses or blocks of forms and sizes suitable for burning in furnaces of any description, so as to raise steam for land and marine boilers, or for use for domestic or other purposes. To effect this, he takes oils or oleaginous matter, whether animal, vegetable, or mineral, crude or refined Canada oil (commonly called petroleum or rock oil), paraffin, and mix these bodies or substances, or any of them with pitch, tar, resin, or turpentine, or the refuse of these substances, turf, moss, or peat, and either singly or together satuates them with sawdust or shavings, or other debris of wood or woody substances finely comminuted, and the substance so obtained he mixes with coal, coal dust, or slack, coke or cinders ground to powder or sifted fine, and when intimately mixed and ground together he passes them through a press and compresses them, when they are fit for use. When any combination is intended for steam purposes, whether for land or marine boilers, the best quality should be supplied, but for domestic purposes several qualities inferior thereto may be used with advantage. Mr. Wall considers that the mixed fuel, being composed of hydrogenous and carboniferous bodies, forms a kind of voltaic pile—the hydrogenous bodies constituting the positive pole, and the coal, cinders, &c., the negative pole. As his positive and negative elements are all finely divided, intimately mixed together—the carbonaceous matters being pulverised and kneaded with the oils which are to supply the hydrogen—and compressed, they are likely to act very nicely. He claims that his fuel, from its being formed of nearly pure hydrocarbons, will be found to consume its own smoke, and any that may arise from any other fuel that may be in contact or burned with it, besides yielding an astonishing amount of light and heat.

MANUFACTURE OF IRON.—The results which have attended the pneumatic process of refining iron must now have been throughly ascertained, so that practical men may readily judge of the modifications necessary to cause it to approach more nearly to perfection. Some improvements have recently been patented by Mr. Wm. Drake, of Sheffield, which consist in the injection into the mass of iron in course of manufacture in the puddling furnace of a liquid composed of the following ingredients, in or about in, the following proportions—that is to say, to every 6 gallons of water is added 1 quart of bullock's blood, 6 lbs. of ground or pulverised charcoal, and ½ lb. of any variety of more or less pure sulphate of baryta ground or pulverised, the variety preferred being "cawk." The water preferred for the purpose is rain water, as being less liable to be impregnated with mineral matters, and the charcoal preferred is oak charcoal. The liquid mixture composed of the foregoing ingredients is applied to the mass of iron in, or about in, the proportion of 3 parts of the mixture to each 3 cwts. of metal, the injection being effected by means of a syringe or other suitable instrument as soon as the iron begins to melt and the sulphur to rise. And it is preferred that the mixture should be thus applied by the injection of about ¼ pint of the same once in about every five minutes, so as to admit of its being well worked into the iron with a puddlers' bar or rake, until the iron becomes in a fit state for drawing out of the furnace. Mr. Drake does not confine himself to the precise tools and mode of mixture referred to, so long as the compound itself is employed.

A remarkable Steam-Boiler has been patented by Mr. E. N. Dickerson, New York. One of these boilers has exhibited such results as to astonish the pratical men who witnessed the trial. The *Providence Journal* says:—

The boilers stand on the dock without any chimney whatever, so that the only draught was that which was produced inside of the boilers themselves, which usually would not serve to make steam in less than two or three hours of firing. In these boilers, however, steam was produced in seventeen minutes from the time the fire was lighted; and in half an hour the pressure was about seventy pounds to the inch. The safety-valve was then opened and the steam blown off at a pressure varying from seventy to thirty pounds to the inch. At the pressure of thirty pounds the safety-valve was blocked open, but the steam could not be blown down below that point, although the safety-valve is about twice as large in proportion to the grate surface as is usual, and the fire was made of ordinary cord-wood burning without any chimney. Instead of blowing off water from the open valve, as boilers usually do, nothing but pure steam could be seen, thus showing that no heat is lost by working water; and the products of combustion as they pass from the boiler tubes are so cooled that persons were walking on the perforated plate through which the hot gases were escaping without burning shoes or clothing, and the hand could be held at the aperture of the tube without any inconvenience whatever. Before the boilers were fired up they were subjected to a cold water pressure of more than a hundred pounds to the inch, which they endured without complaining. The boilers are less than half the usual size, and yet they make pure steam without any "steam chimney," in less than a quarter of the time usually required, and in far greater quantities, from the same weight of fuel, than any other boiler ever constructed can do.

UTILISING REFUSE TINNED IRON.—Some improvements in treating and utilising refuse tinned iron and other combined metals has been provisionally specified by Mr. N. O. André, of Paris. He proposes to subject the cuttings to the action of nitrous or nitric vapours, or any other gaseous acids, with a view to the re-employment of the metals, especially tin, such scraps forming the refuse of various existing manufactures or products. The metal refuse is first poured into a vertical column from five to ten yards in height, and of a size proportionate to the amount of products to be treated. This column is divided into compartments of about fifteen inches in depth by means of wood divisions moving in a horizontal plane. The metal is put in at the top of the column, care being taken to introduce the wood divisions above each compartment when filled, so that the total weight of the metal shall not rest on the bottom but be divided into as many fractional parts as there are compartments. The acid vapours are then introduced at the lower part of the column (nitrous vapours for example), and on the other hand steam is introduced at the same point, which becoming partially condensed renders humid the substances contained in the column. The gaseous acids oxidise the surfaces of the refuse metal and ultimately attack the iron, and this action is allowed to continue in order to ensure the oxidation of all the foreign metals, and when the operation has sufficiently advanced the bottom compartment of the chamber is emptied, and the divisions above mentioned successively withdrawn from the bottom upwards, so as to empty the contents of each compartment into the next below it which has become vacant, while the upper one is charged with a fresh quantity of materials. The refuse, which is now covered with a pasty oxide, is washed in several waters and sorted, while if there be any oxide still adhering it is again washed in acidulated water and then rinsed. The sorting is effected with greater or less care according to the purpose for which these cleaned iron scraps are intended. The acids are reduced and melted in a crucible enveloped in charcoal in the ordinary manner. In order to obtain the tin in a perfectly pure state the oxide is washed in nitric and acetic acids. If the metal scraps have been treated by means of the vapours of hydrochloric acid with a view to obtain the whole or part of the tin in the state of protochloride or bichloride it may be precipitated in a metallic state by means of zinc. The iron scraps or solder which may have been imperfectly deprived of tin or other metal are introduced a second time into the column, or they may be employed in chemical operations where the presence of small quantities of lead or tin is not prejudicial.

CLEVELAND IRON.—The poorer descriptions of pig metal are, for cash, lower than they have been for the past 18 months. The production is very great. The stringency of the Money Market has continued for some time, causing the amount of speculation to be very small; hence, the makers who prefer to sell instead of putting to stock are disposing of their metal, at figures to which the list is scarcely a correct guide. As the prices of raw material are now higher than formerly, and the cost of production, on the whole, more than during the time when a similar range of prices prevailed, the change for the better should, and we hope will, speedily arrive when the masters will not, in order to protect themselves, have to resort to blowing-out their furnaces, in order to reduce their make. The state of things here, so far as prices are concerned, resembles too much South Staffordshire; but it is very different in regard to the activity of the trade. In South Staffordshire it is stated there are 94 furnaces in blast, and a slightly larger number (97) out of blast. Here we have a very different state of things. It may be that as all the furnaces are in blast, excepting the few which are out at Consett, that just at present the production is greater than the sustained demand; but, as the character of the Cleveland iron is better understood and appreciated each year, we may fairly suppose the position of things will be reversed, and, irrespective of the position of other districts, the demand for Cleveland iron will, with occasional slackenings, go on increasing. These remarks only apply to the pig metal trade. The orders for plates, rails, and all other descriptions of manufactured iron are so much ahead of the supply that there is no complaint whatever made as to either the amount of work or prices. There is every reason to expect that a better time for all descriptions of iron will have come round before the present orders for manufactured iron are exhausted. The supply of coke is better than for some time past, and prices are consequently ruling a little lower. The demand for best coal is, owing to divers reasons, exceedingly good. On the 13th of this month another of the collieries belonging to the West Hartlepool Railway, producing a fair description of coke—that of Byers Green—is to be sold by auction at Durham. The projected amalgamation of the West Hartlepool and North-Eastern lines will make the property of more value in connection with the iron district; and, having this is in view, there is every reason to expect it will sell well.—*Darlington and Stockton Times.*

PETROLEUM.—The extent to which petroleum is now used in private families, the accidents occasioned by the ignorance of servants, and the danger to which people may be exposed from being unacquainted with the nature of this substance, render the subject a matter of peculiar interest. We may state, on the authority of Dr. Constantin Paul, who has published a report on the subject, that petroleum is by no means insalubrious, and that the only danger to be guarded against in using it is its great inflammability. This, however, must be kept in mind, that rectified or distilled petroleum is much less inflammable than the article in its raw state. Pure petroleum is white, somewhat less fluid than water, and emits a peculiar smell; it never catches fire when a lighted match is put to it, and this is an infallible test for ascertaining its purity. Of all kinds of petroleum, that imported from Canada is the worst in regard to purity, and the bad smell it has is a sufficient proof of it. Schistus oil should not be mistaken for petroleum—the former is extremely dangerous, on account of its tendency to spontaneous combustion. The following rules for keeping and using petroleum in families should be attended to:—It should be kept in metal bottles, provided with a screw stopper of the same metal, and attached to the body of the bottle by a small chain, that it may not be lost. Glass bottles should never be used for the purpose. The body of the lamp, into which the oil is poured, should be shallow, but wide, in order to ensure a regular light; it should be of glass, so that one may see how much oil there is, without having to hold a candle near it while it is being filled. The burner should be long enough to keep the flame at a distance of at least two inches, and a third from the surface of the liquid. If much longer, the lamp would not give a good light, and if shorter, the lamp might get heated and the solder melt. Petroleum lamps should never be filled by candle-light, to avoid inflammation or explosion; and, in feeding them, enough of the oil should be poured in to last the whole evening. In order to put out the lamp, the wick should be gently let down, until the flame is reduced to a small blue line, and then it is blown out, otherwise an explosion might ensue. When petroleum has caught fire, it should be extinguished by sand or earth, and not by water.

FOX, HEAD, AND CO.'S NEW WORKS AT NEWPORT, IN THE MIDDLESBOROUGH DISTRICT.—These works were started in part in October, and are now in full operation. The works are planned, laid down, and executed in a manner which does credit to Mr. Head's extensive experience and well-known ability as an engineer of the first class. There are in all eight steam-engines, giving 200-horse power in the aggregate, twenty puddling-furnaces, and twelve large heating furnaces, two plate-mills, one of which is reversing; the forge-rolls are, likewise, fixed on the reversing principle; all the mills and other machinery are adapted to heavy plates of large dimensions, of late in great request for ship-building, girders, &c.; neither the puddling or mill furnaces are in any way connected with steam-boilers. The situation is good, one angle of the works being bounded by the River Tees; the Stockton and Darlington Railway serves the works at various points; all fuel and raw material is supplied at one particular side of the works, and the manufactured iron in course of completion gradually travels towards the egress or shipping side of the works. To facilitate outward motion in the small laden trucks, a gentle incline is adopted from the delivery to the discharging section of the establishment. The Newport Rolling Mills are in the midst of the coal district, and can without extra charge be supplied with the best selections of coal. The Newport Blast-Furnace Establishment is close on the spot; other well-known pig-makers are in the immediate vicinity, so that pigs can be delivered into the works at the least possible cost. Fox, Head, and Co. are manufacturing a first-class article—the mark on their iron is "F. H. & Co., Newport-on-Tees, A, AA, AAA;" and as the firm are determined to meet the demand in the market for best iron, we hear that they invariably refuse to place any other mark or brand on their iron, even for their most valued connections. There is sufficient land to increase the establishment to five times its present dimensions. Mr. Fox is connected by family with one of the most wealthy firms in the coal trade at Darlington, and well known as a partner in connection with the old and respectable Neath Abbey concern in South Wales, and takes the mercantile department. Mr. Head is an eminent engineer, formerly on the engineering staff of Robert Stephenson. The other partner is Mr. C. Newcomb, of Kirkleatham Hall, a gentleman connected with a county family of high repute. We consider this a model work; the perfection of the arrangements reminds us of the splendid establishment belonging to Lord Dudley, at Round Hill here, the construction from beginning to end being directed to a reduction of the common charges, the manipulation of the iron in the best and most economical manner, and the substitution of modern machinery for manual labour of various kinds, and as the works are admirably adapted to supply the particular kind of iron most needed in the market, no doubt the proprietors will reap the benefit of their skill and extensive capital, so judiciously expended in this unique establishment.—*Griffiths's Iron Trade Circular.*

SALES OF LEAD ORE.

LEAD ORES SOLD FOR THE QUARTER ENDING SEPTEMBER, 1864.

Mines.	Tons.	Amount.
Minera	1553	£22,342 14 0
Isle of Man	400	9,067 10 0
Great Laxey	300	7,772 10 0
Talargoch	452	6,507 19 3
Cwmystwith	340	4,757 10 0
Wheal Mary Ann	177	4,364 1 6
Wheal Frank Mills	275	4,172 10 0
Macsysafn	280	4,130 0 0
East Darren	225	3,858 15 0
Rhossesmor	266	3,749 12 0
Dyliffe	256	3,668 14 0
Frongoch	254	3,530 12 0
Cargoll	196	3,517 10 3
Cwm Erfin	186	3,265 13 6
Glogfach	170	3,099 0 0
East Logyias	190	2,606 0 0
Herodsfoot	70	2,108 15 0
Bryn Gwiog	135	2,028 7 6
Havan	100	1,376 5 0
Minera Boundary and Lower Elsteddfod	90	1,260 0 0
Twelve Apostles	80	1,135 0 0
Long Rake	80	1,128 7 6
Nanty	55	815 7 6
Roman Gravels	56½	805 10 6
Dyfngwm	58	798 2 0
Parry's	52	775 13 0
North Henblas	55	752 2 6
Llanerchyraur	51	735 7 6
Bronfloyd	50	729 7 6
Minera Union	50	705 0 0
Deep Level	50	698 7 6
Newtownards	45	618 15 0
South Darren	31	615 14 4
Pool Park	38	568 15 0
Westminster	40	563 0 0
Goginan	30	559 10 0
Hendre Ucha	38	537 8 0
Pennant	37	523 18 6
Bryn Gwyn	35	512 7 6
North Devon	40	511 0 0
Dog Pit	37¼	502 1 6
Talisker	41	493 0 6
Billins	37	484 0 6
Bwich-y-Plwm	31½	431 11 0
Hope	25	375 12 6
Pant-y-Mwyn	26	354 10 0
Penrychyn	21	294 0 0
Pen-yr-Orsedd	20	284 0 0
Cwmbyr	21	278 15 6
Silver Mountain	20	278 5 6
West Frongoch	20	246 0 0
Cae Conroy	13¾	208 17 6
Bryntail	12	196 13 6
Llangynog United	12½	167 16 3
Speedwell	12	153 17 0
Brynford Hall	11	151 12 0
Fron Hall	8½	109 16 0
Pant-y-Pydew	6	85 10 0
Aberdovey	4½	63 13 6
Trelogan	4½	63 0 0
Merllyn	4	57 2 0
Mount Pleasant	4	56 2 0
Pantne	3	40 19 0

BLENDE.

Great Laxey	800	3,542 10 0
Minera	470	2,748 4 0
Isle of Man Company	30	67 10 0

SALES OF BLACK TIN.

BLACK TIN SOLD FOR THE QUARTER ENDING SEPTEMBER, 1864.

Mines.	Tons.	Amount.
Great Wheal Vor	146	£ 9,648 4 10
Carn Brea	135½	8,136 0 0
St. Just United	44½	2,720 7 6
St. Day United	48¾	2,582 6 8
Par Consols	40¾	2,571 2 0
New Birch Tor and Vitifer Consols	37	2,406 3 10
Phœnix	24¾	1,336 14 10
Wheal Kitty (St. Agnes)	20¾	1,274 1 7
West Fowey Consols	19¾	1,220 18 8
Basset and Gryills	20¼	1,201 13 6
Penhalls	12¾	846 10 6
South Carn Brea	12¼	834 19 6
Great Wheal Busy	14	764 15 0
Leeds and St. Aubyn	12	761 11 6
Wheal Norris	10½	669 5 0
Gunnis Lake	10¾	647 2 4
Wheal Grenville	10¼	639 17 3
Cornubia	8¼	539 14 6
Pendeen Consols	9	537 3 0
Pedn-an-drea	8½	489 4 5
North Basset	7½	439 14 2
Wheal Par	6¼	400 3 0
Furze Hill Wood	5¾	362 9 2
Guriyn	3¾	229 2 0
Wheal Sidney	3½	224 18 2
West Basset	3¼	203 6 10
East Grenville	3	191 8 6
North Jane	2½	139 4 6
West Par	1	48 12 6

SOLD BY THE PARCEL.

Great South Tolgus	£ 557 4 5
West Basset	246 7 0
Wheal Agar	56 6 9

PROFITS OF MINING.—A private letter from Australia says—"One of my friends, in his last communication, tells me an instance of an astounding increase in the value of mining shares, which I have not seen alluded to anywhere. The shares in one of the quartz-crushing companies at Daleysford were at 45*l.*; in twenty-four hours they advanced to 85*l.*, and in thirty-six to 500*l.*, with few if any sellers at that price."—*London Review.*

THAMES TUNNEL COMPANY.—Receipts for the week ending Dec. 3, 86*l.* 5*s.*; number of passengers, 20,700.

FOREIGN MINES.

EAST DEL REY.—Capt. W. Treloar, Oct. 28: Morro Sao Vicente: The fall of ground has caused some drawback to our operations, but in a week or ten days I hope everything connected with the pitwork will be ready to work again. The driving of Smithy level has proceeded with regularity.—Capao Mine: The deficiency of water for working our machinery in this mine is most vexatious. I hope, however, this will be the last season we shall be so inconvenienced for stamping power. The rainy season is near at hand, so that we may expect water for the stamps shortly. Such repairs as are required to the stamps, water-wheels, &c., will be attended to at once, so that as little delay as possible may occur to the stamps after we have water power. The lode at Henderson's shaft, as a whole, still looks very well. East of the shaft it has somewhat contracted, but west of the shaft it still continues to enlarge, and looks well. As it will be requisite soon to leave a pillar at the east of the shaft, I have requested the end of the ground to be squared down, that we may take advantage of leaving this piece of ground as a pillar.—Emily Mine: The bottom of the Brazilian sink has been reached, and I hope now to make a fair and speedy examination of the lode.

DON PEDRO NORTH DEL REY GOLD.—Capt. T. Treloar reports—The operations generally have been carried on vigorously, and a very satisfactory amount of work has been accomplished. The shallow adit is being hastened on by every means in our power. At Macquine we are cross-cutting in jacotinga, the character of which is everything that could be desired.—Force: On Oct. 23 we received here an addition to our force of 17 emancipated blacks.

ANGLO-BRAZILIAN GOLD.—Capt. T. Treloar, Nov. 1: The driving in the deep and Barril adits is progressing; at the former the ground has continued, on the whole, more favourable than in September, and more advance has been made than in that month. The ground at the communication from Haymen's shaft to Deep Mine still requires the presence of Englishmen, so that we have not been able to remove them to the deep adit; we shall, however, do so when they can be spared. At Foster's the sinking is proceeding with regularity—a branch of lode has been encountered, and the stone passed through the stamps. The lodes at the Buraco Secco and Gongo Mines are favourable in appearance. The larger proportion of the stone from the former mine is now conveyed by barrows to Haymen's, and from thence to the surface by the whim, which I am pleased to report is now working, and when the mules become used to and broken in to this kind of work will render most effective service. We have had an addition of 24 hands to our force. They are coast blacks ,lately freed by the Brazilian Government.

SANTA BARBARA.—Capt. Bryant, Pari, Oct. 28: Reduction Department: Stamped from Sept. 20 to Oct. 20: No. 1 shaft and bottoms, 333 tons; No. 2 south bottoms adit level, 157 tons=490 tons. Gold cleaned, including what was reported in my last, 2054 ozs. In consequence of the accident to the amalgamating machinery previously mentioned, I am not yet in a position to give the exact produce of the stone. Since writing you last, we have cleaned up another 100 ozs., making with the 400 ozs. reported in my last, 550 ozs., which should have been remitted on Sept. 25. This would give a produce for August to September 20 of rather over 3 ozs. per ton, and the produce from Sept. 20 to Oct. 20 will be from 3·3 ozs. to 3·5 ozs. per ton. The stone from the different points has been stamped separate, but we have been obliged to mix the sand in amalgamating, so that about 3·5 ozs. per ton will be the average of the whole. I hope shortly, when the increase to the amalgamating machinery is completed, to give the yield from each part separate and regularly. We have had some days' rain, but not quite enough yet to raise the springs, so as to give a full stream of water to the stamps. You will observe that there is no sand re-stamped during the month, which, of course, will have a tendency to lessen the produce per ton of stone. I hope during the present month, with an increase of water, to stamp from 600 to 700 tons, and shall commence to repair the three stamps, to re-stamp sand or any other surplus stone that may remain.—Mine: In the shaft the lode has again turned down more towards the perpendicular, and is not for the present quite so large; in the stopes it maintains its size, and the stone has the usual appearance. In No. 2, or south bottoms, below the adit level, the lode, so far as opened, is from 10 to 13 ft. wide, and the stone will yield about 3·5 ozs. per ton—a very great improvement to anything we had previously seen at the same horizon in any other part of the mine.

NOVA SCOTIA LAND AND GOLD CRUSHING AND AMALGAMATING.—From Sherbrooke the agent writes that the Cumminger lead has improved since last report. From Oldham the agent states that the alterations to the crusher were not quite complete, that he had 150 tons of quartz ready for crushing, and anticipated having about 200 tons ready by the time the crusher was ready.

NEW WILDBERG.—Z. Walls, Dec. 3: The sinking of both Carter's and Michell's shafts, considering the hardness of the ground, is proceeding first-rate. Carter's shaft is now 6 4-5th lachters below the 30, and Michael's shaft is 6 lachters below the 10. The Erbteifstergang lode, at the 30 lachter level, has a very kindly appearance for the production of silver-lead ore, but up to this time is unproductive. The No. 1 sink, going down below the 20, on the same lode, is now 8 lachters deep, but its present bottom is unproductive. Our estimated returns for December are 110 tons.

LUSITANIAN.—Nov. 26: In Taylor's engine-shaft the lode is 4 ft. wide, composed of quartz, mundic, and copper, worth for the latter 2 tons per fathom. The lode in the 80 fm. level, east of Taylor's, is in small strings, and unproductive. The lode in the 80, west of same shaft, is worth 1 ton per fathom. In Perez' shaft the lode is composed of quartz and the country. The rise above the 38, against Perez' shaft, is of the same quality as in the shaft. The lode in the 70, east of River shaft, is composed of quartz and copper. In the 70, west of Taylor's, the lode is 1¼ ft. wide, producing stones of ore. The lode in the 60, west of slide lode, is composed of quartz and flookan, mixed with the country. The ground in the 60 cross-cut, north of River shaft, is of a hard gneiss. The lode in the 50, west of slide lode, contains stones of ore. In the 38, west of Perez' shaft, the lode is 6 inches wide, composed of quartz and stones of ore. The lode in the 28, west of Perez' shaft, is composed of quartz and stones of ore. In the 18, west of Perez', the lode is composed of quartz. The lode in the 8, west of Perez' shaft, is unsettled, and split into branches. Riberio's winze is worth 1 ton per fathom. Finasco's winze is worth 1 ton per fathom. The ground in the 28 cross-cut is composed of a hard gneiss.—Stopes: The stopes above the 8, west of Perez' shaft, are worth ⅝ ton per fathom. The stopes above the 60, east and west of River shaft, are worth 1 ton per fathom. The stopes above the 60, west of Joaquim's winze, are worth 1¼ ton per fm. The stopes above the 70, between Taylor's and River shafts, are worth 1½ ton per fm. The stopes above the 50, east and west of Norte's winze, are worth 1½ ton per fathom. The stopes above the 70, west of Taylor's shaft, are worth ⅛ ton per fathom. The stopes above the 80, east of ditto, are worth 1½ ton per fathom. The stopes above the 50, east and west of Machado's winze, are worth 1 ton per fathom. The stopes above the 60, east and west of Jacintro's winze, are worth 1½ ton per fathom. The stopes above the 40, west of slide lode, are worth ⅛ ton per fathom. In the 50, east of slide lode, the lode is 6 inches wide, containing stones of ore. The ground in the 28 cross-cut, south of slide lode, is hard for driving. In the 50, west of Oak shaft, the lode is 15 inches wide, composed of quartz, spotted throughout with lead.—Carvalhal Mine: The incline shaft is being cut down below the adit, where the lode is worth ⅛ ton per fathom for blende. It is also being cut down below the 10, but the lode is unproductive.

JUDGMENT CREDITORS.—It has been decided by Vice-Chancellor Wood that in order to entitle a judgment creditor to payment in priority over creditors by simple contract in an administration suit, his judgment must be registered. This question, which had never before been decided between those two classes of creditors, was raised in the case of Walter *v.* Turner.

LIMITED LIABILITY AS CONTRIBUTORIES.—The Lords Justices have affirmed the decision of the Master of the Rolls, in *re* the Exhall Coal Mining Company, holding that when a person applies to a company for a certain number of shares, but before registration, or anything done to fix his liability in respect of his application, he expresses a wish to diminish the number of shares, and the company assent to this proposal, there is nothing to prevent such an alteration of the original transaction. The mere fact of the acceptance of the shares first applied for, and the payment of the first deposit or call on them, do not make the original contract so irrevocable as that both parties cannot dissolve it.

BILLS OF EXCHANGE.—It has been held by the Court of Queen's Bench, in Deuters *v.* Townsend, that where a holder of an over-due bill has commenced an action upon it against the acceptor, and has subsequently endorsed the bill away, the indorsee is entitled to sue the acceptor in a second action, although he took the bill with notice that the first action was still pending. The defendant's remedy against the first action, after the commencement of the second, is by application to the Judge at Chambers to stay the proceedings in the first.

REGISTRATION OF DESIGNS.—The Court of Queen's Bench has decided that the 20 and 21 Vict., chap. 70, sec. 5, which enacts that the registration of any pattern or portion of an article of manufacture to which a design is applied, instead or in lieu of a copy, drawing, print, specification, or description in writing, shall be sufficient, applies to cases where the novel design is a combination, as well as to cases where it is a simple design, complete in itself. The point arose in the case of Macrae *v.* Holdsworth, where the inventor of a design to be applied to woven fabrics, consisting of the combination of a certain groundwork with ornamental stars of a particular form, had registered a portion of the woven fabric to which the design had been applied, unaccompanied by any explanation or description of the design which he claimed as his invention. The Court held that the registration was sufficient.

ACTION FOR CALLS.—Some time since an action was brought to recover from a person named Stokes the amount of a call of 5*l.* 10s. per share, made by the liquidator in winding-up the General Discount Company, in which the defendant held 20 shares. The defendant, in answer, pleaded his bankruptcy, the facts being these:—The defendant became bankrupt in November, 1860; in July, 1861, the call was made; and in February, 1862, the defendant obtained his certificate. At the trial, before Mr. Justice Byles, the Jury found for the plaintiff, but subsequently a rule was obtained to enter a verdict for the defendant. In the Court of Common Pleas cause was shown against this rule being made absolute. The question raised for the Court was whether the amount of the call upon the defendant's shares was a "contingent liability," which ought to have been proved under the bankuptcy, instead of being sued for in the present action? The Court, after hearing an argument of some length, held that the liability to pay these calls was not a liability in respect of which there could have been a proof under the bankruptcy, and therefore that the verdict for the plaintiff must stand.—Rule discharged.

PRICES OF MATERIALS,

As charged at PROVIDENCE MINES during the following months of 1864:—

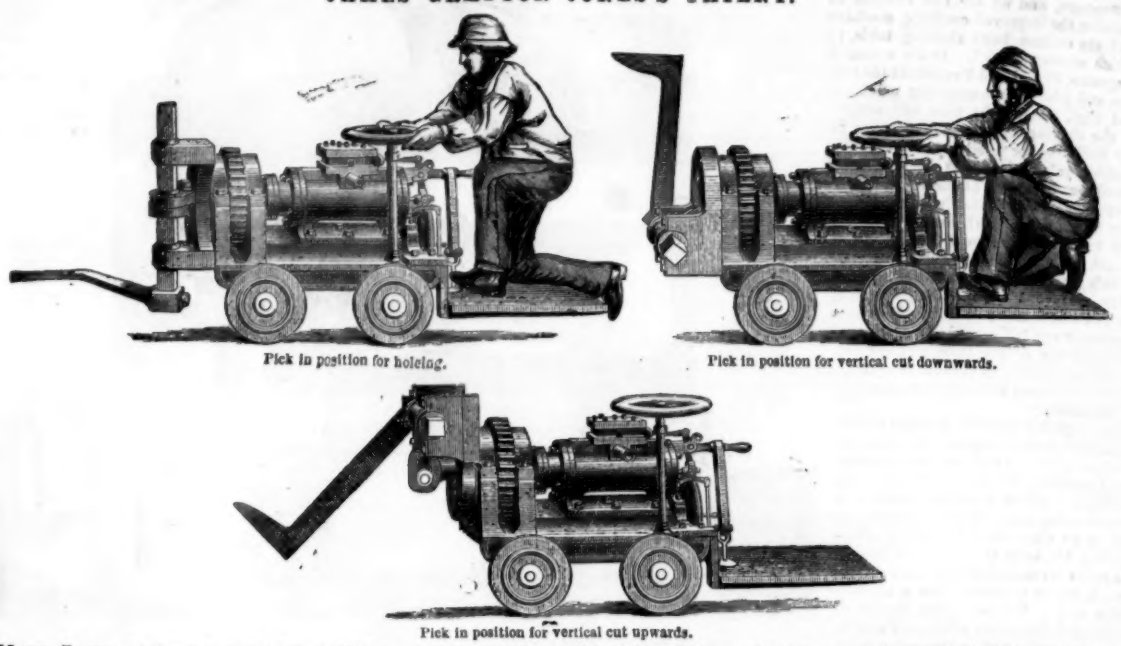
Description.	July.	Aug.	Sept.
Common iron .....per cwt.	10s. 6d.	—	—
Hoop ditto..... „	14 6	—	—
Best cast-steel ..... „	70 0	—	—
Borer ditto, second quality „	38 0	—	—
Nails, 6-inch patent .... „	19 0	—	—
Ditto, 5-inch ditto ..... „	19 0	—	—
Ditto, 4½-inch ditto .... „	19 6	—	—
Ditto, 4-inch ditto ..... „	19 9	—	—
Ditto, 3½ inch ditto .... „	20 0	—	—
Leather.....per lb.	1 8	—	—
Norway timber .....per foot	8d.–10d.	8d.–10d.	8d.–10d.
Yellow pine ditto ..... „	1 4	1 4	1 4
M. C. coals* .....per ton	11 5	11 1	11 9
Best candles†.....per dozen	5 3	5 3	5 5
Tallow† .....per cwt.	—	45 9	—
Olive oil† .....per gallon	—	5 6	5 4
Powder† .....per 100 lbs.	—	46 0	—
Safety-fuse† .....per coil	—	0 4	0 4
Hilts† .....per dozen	—	1 9	—

* Delivered at St. Ives per contract. † Delivered free of carriage.

LONDON GENERAL OMNIBUS COMPANY.—The traffic receipts for the week ending December 4 was 10,525*l.* 0s. 5d.

COAL CUTTING MACHINERY.

JAMES GRAFTON JONES'S PATENT.



Pick in position for holeing.

Pick in position for vertical cut downwards.

Pick in position for vertical cut upwards.

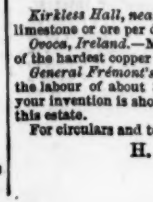
Messrs. JONES and LEVICK, proprietors of this patent, are prepared to supply these Machines, which are on an improved principle, and are constructed to work the coal at any angle from the horizontal to the vertical, thus rendering them capable of "holeing" at any angle, and of driving "headings." They are simple and substantial in construction, and are not likely to get out of order. They are already successfully employed in the Barnsley coal district, and are being introduced into the South Wales and other coal mining districts. They are also suitable for mining the argillaceous ironstones of the coal measures, as well as working other mines and quarries.

N.B.—Air Compressing Machinery will be supplied, or plans and specifications furnished.

Applications to be made to Messrs. FREDERICK LEVICK and Co., 4, Charlotte-row, Mansion House, London; or Messrs. LEVICK and SIMPSON, Blaina Ironworks, near Newport, Monmouthshire.

Prize Medals—International Exhibition, Class 1 and 2.

PATENT PLUMBAGO CRUCIBLES.—



The CRUCIBLES manufactured by the PATENT PLUMBAGO CRUCIBLE COMPANY are the ONLY KIND for which a MEDAL has been AWARDED, and are now used exclusively by the English, Australian, and Indian Mints; the French, Russian, and other Continental Mints; the Royal Arsenals of Woolwich, Brest, and Toulon, &c.; and have been adopted by most of the large ENGINEERS, BRASSFOUNDERS, and REFINERS in this country and abroad. The GREAT SUPERIORITY of these melting pots consists in their capability of melting on an average 40 pourings of the most difficult metals, and a still greater number of those of an ordinary character, some of them having actually reached the EXTRAORDINARY NUMBER of 96 meltings. They are unaffected by change of temperature, never crack, and become heated much more rapidly than any other crucibles. In consequence of their great durability, the saving of waste is also very considerable.

The company have recently introduced CRUCIBLES SPECIALLY ADAPTED for the following purposes, viz.:—MALLEABLE IRON MELTING, the average working of which has proved to be about seven days; STEEL MELTING, which are found to save nearly 1¼ ton of fuel to every ton of steel fused; and for ZINC MELTING, lasting much longer than the ordinary iron pots, and saving the great loss which arises from mixture with iron.

For lists, testimonials, &c., apply to the Patent Plumbago Crucible Company, Battersea Works, London, S.W.

Fully described in the MINING JOURNAL of July 5.

MESSRS. W. EASSIE AND CO.,

RAILWAY SAW MILLS, MOULDING SHOPS, &c., AND GENERAL TIMBER CONVERTING YARDS, HIGH ORCHARD, GLOUCESTER,

Are PREPARED to FURNISH QUOTATIONS for any description of WOOD FITTINGS for home or foreign RAILWAY STATIONS, BARRACKS, EXHIBITIONS, DWELLINGS, WAREHOUSES, FACTORIES, STORES, GLASS HOUSES, &c.

They will also CONTRACT for WOODEN FITTINGS of ANY KIND in CONNECTION with IRON BUILDINGS, &c.

The above would in all cases be consigned ready fitted, so as to ensure speedy re-erection.

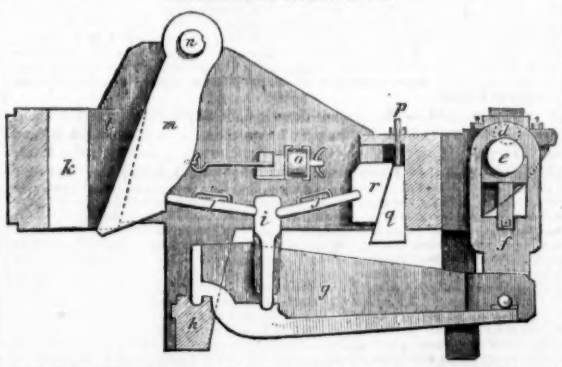
Numerous drawings of works of the above nature, already executed, can be seen on application, and references permitted to the engineers thereof.

The above Firm supply Barrows, Carts, Wagons, temporary Huts, permanent Shedding, and every description of Miners' and Contractors' Tools, at the very lowest prices. References can be given where many thousands of the above have been supplied to different parts of the world. Prices quoted on application. Delivered to any station, or home or foreign port.

BLAKE'S PATENT STONE BREAKER,

OR ORE CRUSHING MACHINE,

FOR REDUCING TO SMALL FRAGMENTS ROCKS, ORES, AND MINERALS OF EVERY KIND.



It is rapidly making its way to all parts of the globe, being now in profitable use in California, Washoe, Lake Superior, Australia, Cuba, Chili, Brazil, and throughout the United States and England.

The above section illustrates Blake's Stone Breaker, just as made the last five years, and is fully protected in every part by patents.

Extract from Specification:—A short but powerful vibration is imparted to one or both of the jaws by any convenient arrangement, and combination of powerful levers, worked by a crank or eccentric on the main shaft.

LEGAL PROCEEDINGS will be taken at once against any person or persons found making, using, or vending any machine, the construction of which will constitute an infringement on the above patent. Read extracts of testimonials:—

Alkali Works, near Wednesbury.—I at first thought the outlay too much for so simple an article, but now think it money well spent. WILLIAM HUNT.

Welsh Gold Mining Company, Dolgelly.—The stone breaker does its work admirably, crushing the hardest stones and quartz. WM. DANIEL.

Our 15 by 7 in. machine has broken 4 tons of hard winstone in 20 minutes, for fine road metal, free from dust. Messrs. ORD and MADDISON, Stone and Lime Merchants, Darlington.

Kirkless Hall, near Wigan.—Each of my machines breaks from 100 to 120 tons of limestone or ore per day (10 hours), at a saving of 4d. per ton. JOHN LANCASTER.

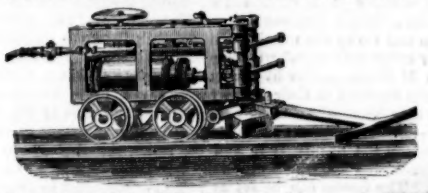
Oreoca, Ireland.—My crusher does its work most satisfactorily. It will break 10 tons of the hardest copper ore stone per hour. WM. G. ROBERTS

General Frémont's Mines, California.—The 15 by 7 in. machine effects a saving of the labour of about 30 men, or $75 per day. The high estimation in which we hold your invention is shown by the fact that Mr. Park has just ordered a third machine for this estate. SILAS WILLIAMS

For circulars and testimonials, apply to—

H. R. MARSDEN, SOHO FOUNDRY,
MEADOW LANE, LEEDS.
Only maker in the United Kingdom.

COAL CUTTING BY MACHINERY.



MESSRS. RIDLEY AND CO. have, by recently PATENTED IMPROVEMENTS, COMPLETED their TRUNK COAL CUTTING MACHINE, WORKED by COMPRESSED AIR, and are NOW PREPARED to NEGOCIATE for the USE, and to SUPPLY MACHINES, which will be found to COMBINE SIMPLICITY of CONSTRUCTION with PORTABILITY and ECONOMY in WORKING. By the use of these machines a CONSIDERABLE SAVING of COAL is EFFECTED, and the COST of LABOUR MUCH REDUCED. Each machine will be guaranteed as to its capabilities, &c.

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We repair them at half the first cost, making them equal in size to new ones, all parties returning them carriage paid.

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